

The Mining Journal

Established 1835

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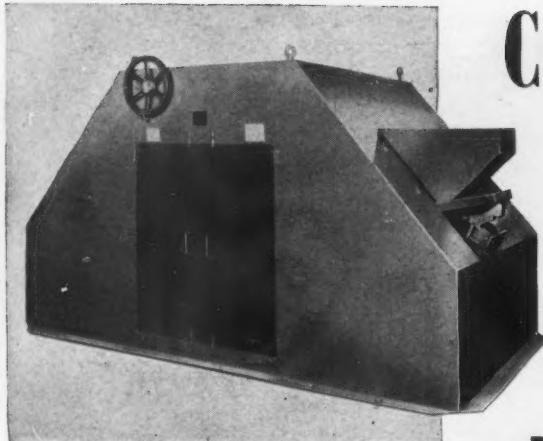
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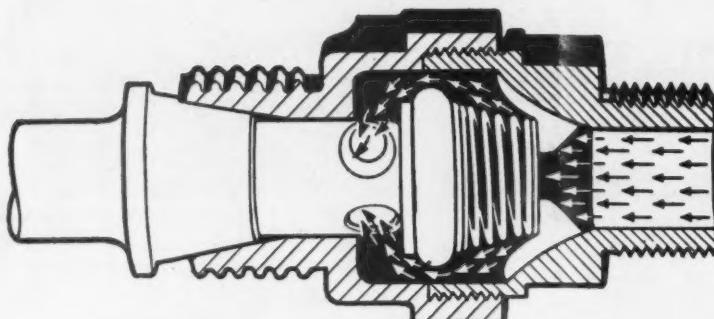
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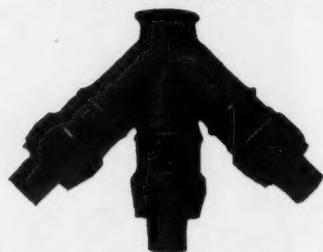
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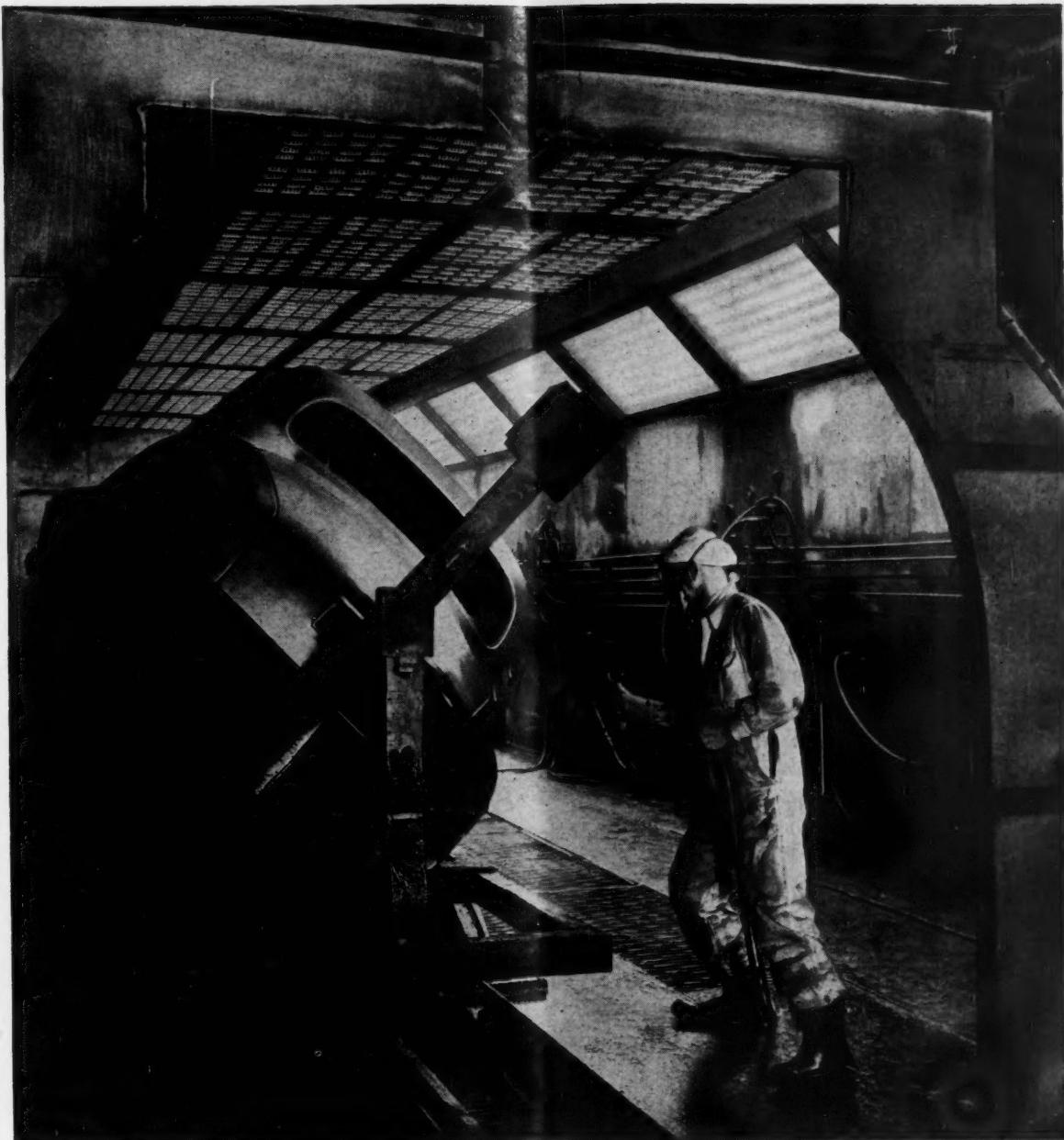
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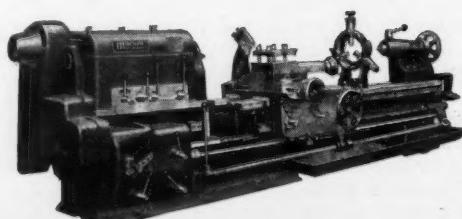
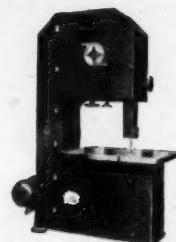
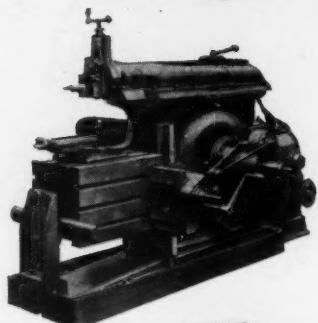
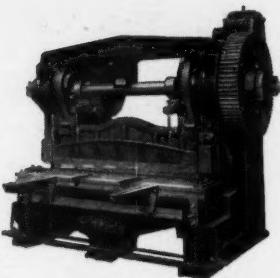


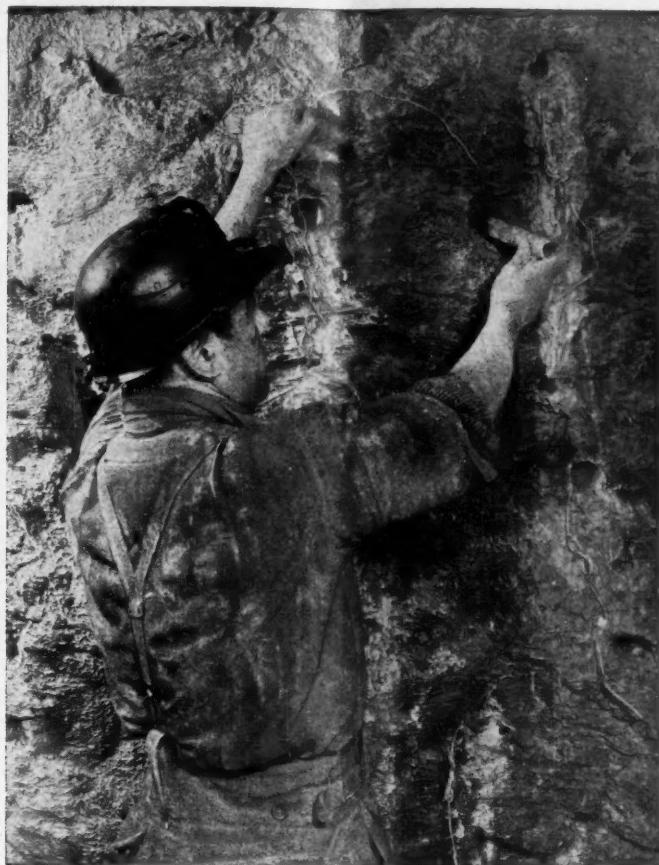
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NOTES AND COMMENTS

Australia to Survey Mineral Resources of Antarctica

Sometime this month the first all-Australian Antarctic expedition is expected to arrive on the Antarctic mainland to set up a permanent research station.

The purpose of the expedition is to carry out a geological survey on the frozen continent which, it is believed, contains rich deposits of copper, lead, silver and possibly gold. It is known, however, that the mineral deposits include an abundance of coal and, from data gathered by previous expeditions supplemented by aerial photographs, it would appear that there is a 1,500 mile coal seam running from the South Pole to the coast, along the eastern boundary of the Australian sector of Antarctica.

How intensively the party hopes to carry out its survey is not altogether clear. The chief obstacle to be overcome is, of course, the difficult ice formations. Nevertheless, previous preliminary work has indicated that the underlying terrain is not likely to provide any novel features, although geological specimens of interest, coming from the moraine of glaciers present the problem of deciding where the fragments were first picked up by the slowly moving ice. In any event, the question of working under the ice—at this stage at any rate—does not arise, and it is proposed that the prospectors explore the exposed rock formations and thus any mining carried out would be on these outcrops.

The expedition will arouse widespread interest but hopes should not be pitched too high as to what can be achieved. overshadowing the whole expedition is the essential task of setting up a permanent Australian mainland base, nearer to the South Pole than any existing station, and much will depend on how successfully the party accomplishes this task as to how much freedom of action the geological party will have.

The Russian Janus

While Mr. Molotov was saying no in Berlin to the Eden plan as an acceptable basis for discussing the German problem, his colleague in Moscow, Mr. Ivan Kabanov, Soviet Foreign Trade Minister, was telling a party of British businessmen that the Soviet Union was ready for a considerable increase in the volume of trade with the United Kingdom, "if British industry has serious intentions of extending trade with the U.S.S.R."

In terms of sterling, Mr. Kabanov said that the Soviet Union was prepared to place orders exceeding £400,000,000 in Britain within the next three years for a wide range of equipment. Indeed, one or two substantial orders have already been placed with United Kingdom companies, and agency messages report that several more contracts are under serious consideration.

The tremendous increase in the volume and value of the Soviet purchases now proposed would undoubtedly provide a substantial market outlet for British goods, but it remains to be seen how many of the 61 items of equipment listed by the Soviet Trade Minister would come under the ban on the export of strategic goods to the Soviet Union.

For the manufacturers of mining machinery and allied equipment, Soviet proposals hold out the promise of sizeable orders. Concentrating, crushing and milling equipment, diesel engine generating sets and shunting locomotives, dredgers, suction dredgers, cranes, bulldozers, locomotives, and many other items which, in total, would add up to many million pounds worth of business.

Mr. Kabanov also told the British delegation that the Soviet Union wanted to increase her exports to Britain. Trade turnover between the two countries would have to be raised to 5,000,000,000 roubles a year if sales of Soviet goods to Britain in 1955 and 1957 were to correspond to her imports from Britain. "Given proper conditions in

respect of normalities of Anglo-Soviet trade," he said that orders would be placed by the Soviet foreign trade organizations, and subsequently it might be possible to increase "the diversified and different character of goods which we would like to buy from Britain."

At first sight it would appear that a high proportion of the items on the Soviet trade list would have a difficult time overcoming the export restrictions, but precisely what comes under the heading of strategic shipments must be very difficult to define. Nevertheless, this is a point which cannot lightly be dismissed and it was interesting to note that the initial reaction in the United States to the Soviet offer to buy over £400,000,000 of industrial equipment from Britain has been to present it as a major move to persuade Britain to ease existing strict controls on strategic shipments to the Soviet *bloc*. Certainly, the offer is politically opportune, coming as it does after the announcement that U.S. economic aid to Europe would definitely dwindle in the months ahead.

Thus even if the Russians have no difficulty in reconciling Mr. Molotov's closed fist in Berlin with the open hand extended by Mr. Kabanov in Moscow the distinction between matters essentially political and matters essentially economic will not be so easily recognized in the United Kingdom. It would seem, therefore, that the Soviet offer will have to be scrutinized by the Government and its decision—one way or another—justified in Parliament. If, as is likely, the crux of the Soviet trade offer revolves around a definition of what is "strategic," the U.K. Government will be confronted with the problem of weighing in the balance the political deadlock in Berlin against the attractive trade offer in Moscow.

Commonwealth Development Finance Company Aids Development of Natural Gas in Pakistan

The Commonwealth Development Finance Company, the formation of which was the direct outcome of the 1952 meeting in London of the Commonwealth Finance Ministers, has announced its first overseas investment—the rupee equivalent of about £1,000,000 in the equity of the Sui Gas Transmission Company Ltd.—a natural gas transmission venture in Pakistan.

The total capital cost of the project is estimated at £9,000,000 and an application has been made to the World Bank for a loan of approximately £5,000,000, the remaining £3,000,000 of the equity capital being provided equally by Burmah Oil, the Pakistan Industrial Development Corporation, and by private investors in Pakistan.

The discovery of gas at Sui was made by Pakistan Petroleum Ltd., a subsidiary of the Burmah Oil Company, while drilling for oil in Baluchistan, West Pakistan, in 1952. The Sui well was quickly followed up by another on the same structure which proved the existence of an extensive gas pool, and a third well in the same area at Zin, about 50 miles to the north, is now being drilled to determine the extent of the gas field.

The new venture has aroused hopes in Pakistan that something akin to a revolution in its fuel system will be brought about by the transmission of the Sui gas, which will be piped to Karachi through a 16 in. pipeline about 350 miles long and will enable Pakistan to distribute the cheapest fuel in the East. Moreover, it is estimated that Pakistan's foreign exchange savings would rise from about £3,000,000 initially to about £9,000,000 a year as it is estimated that the natural gas would supply a heating value equivalent to about 1,600,000 tons of coal per annum, which compares with the country's annual coal output of 600,000 tons and an annual consumption of about 2,000,000 tons.

Brazil

(From Our Own Correspondent)

Teresopolis, January 12

Though no statement has been made here, it is a fact as reported by Reuter that the Brazilian Government has authorized the Companhia Estanifera do Brasil (see *The Mining Journal* of February 13, 1953) to import 3,000 tonnes of tin ore from Holland under the Netherlands Payments Agreement. The ore will be processed by the importer for the National Steelworks at Volta Redonda, which had planned to increase production of tinplate from 700 to 1,200 tons in 1954, but has been unable to acquire the necessary ore supplies.

Local requirements of cassiterite will by then have reached 3,000 tons annually, but Brazilian production is still only 400 tons, sufficient for 200-300 tons of metallic tin. This is concentrated at São João del Rei, mainly by Estanho Minas-Brasil and Estanho São João del Rei, two enterprises formed and financed in 1945, by the Soliva group.

Since it began operating the Companhia Estanifera has been incessantly urging the government to facilitate imports of tin ore and enable it to raise production to 4,000 tons of metallic tin annually. Negotiations were opened with La Paz in 1952 to import supplies from Bolivia, but towards the end of that year the new Bolivian government signed contracts with the Salim Chacur group, of Buenos Aires, to install modern smelting and refining plant in Bolivia and export 8,000 tons of metallic tin annually to Argentina.

When these arrangements fell through, negotiations were resumed between Brazil and Bolivia and it has now been agreed that Brazil would import annually 1,000 tons of tin ore, valued at U.S. \$1,000,000.

Earlier the Brazilian Minister of Foreign Affairs announced that the Mixed Brazil-Bolivia Commission hoped to obtain a larger quota, provided the quantities allotted to Great Britain and United States would permit. The Minister added that it might be possible to obtain supplies from Holland and that he was examining the possibility of a bilateral agreement with Indonesia, Brazil to import petroleum and tin against payment in convertible currencies.

POSSIBLE ACCESS TO CONCENTRATES

Brazil may, therefore, have access to more concentrates than she requires. In July 1952 the Council of Mines and Metallurgy, with a view to protecting local mining activities, recommended that imports of tin ores be limited to the difference between Brazil's requirements and the output of her mines. The potential output was then estimated at 600 tons annually, but there seems no doubt that it can be substantially increased, provided the necessary incentives are offered. Brazil's known reserves were listed in *The Mining Journal* of June 30, 1950, and December 7, 1951. The Council for Foreign Trade has since urged the government to prohibit imports of metallic tin as soon as local production meets consumers' needs.

Imports of unwrought tin reached 2,487 tons in 1951, the peak year, and included 717 tons from the Malay Straits, 478 from Great Britain and 1,292 from Holland. Imports dropped to 1,241 tons in 1952 and to 61 tons during the first seven months of 1953, when all imports were drastically restricted. Your correspondent has not yet been able to ascertain the price paid for the 3,000 tons, now purchased in Holland, but unless special arrangements were made the importer must have paid a premium of approximately 80 cruzeiros per dollar.

ASIAN MINING—I

Mining Development in Asia and the Far East

A conference held in Tokyo last year under the auspices of the Economic Commission for Asia and the Far East (E.C.A.F.E) brought together information which enabled a comprehensive picture of minerals development in this region to be presented. This information was summarized in a series of articles published in *The Mining Journal* during June and July, 1953. It has been brought up to date in the latest annual report prepared by the Commission's Secretariat for the period 1952-53, and records an expansion of mining activities in most of the countries surveyed. The following article, the first of two instalments, deals with progress in the various countries in the region, while the final remarks to be published will be concerned with individual metals.

In Burma the government has established a Mineral Development Corporation, which will be responsible for all the mineral resources development programmes of the country. Actual mineral production was still far below the pre-war level, but a fairly substantial volume of ores and metals, contrasting with the stagnation prevailing a few years after the war, was shipped from Rangoon, Tavoy and Mergui. Unfortunately Burma was not able to reap the benefit of high prices for metallic ores, since the internal situation kept production at a low level. The recent fall in prices will undoubtedly slow down the rehabilitation work of the mines.

TREND TOWARDS INCREASED PRODUCTION

The political situation of Cambodia, Laos and Viet-Nam has not shown any improvement, with the result that there was little mining activity, with the exception of the coal industry of Viet-Nam. On the other hand, there were important developments in mainland China, where production generally has expanded. There has also been an increase in the trend of production in respect of most of the mineral commodities in India, whose first Five-Year Plan was presented to Parliament in December, 1952. The total expenditure earmarked for mineral development under this Plan is Rs. 10,610,000. To co-ordinate the work and review the progress of the programme the Ministry of Natural Resources and Scientific Research has set up a technical committee with representatives from all organizations concerned. A thorough examination of all copper, lead, zinc and tin ores has been recommended.

Japan was able, for the first time in history, to export titanium metal. In Korea there was no major shifting of battle lines. As a result, production of all mineral commodities in South Korea has shown a considerable increase. In 1952, total exports of mineral products were valued at U.S. \$19,691,316. The United Nations Korean Reconstruction Agency worked closely with the Korean Bureau of Mining on long-range development plans for the mining industry. With the improvement of security conditions in Malaya, it was expected that more prospecting and geological survey work would be possible last year.

In the Philippines the period under review was marked by an increase in the production of all metals as a result of strenuous endeavours of the mining companies to boost their output at the same basic costs, despite the mounting expenses due to the effects of dollar exchange, import controls, taxes, labour demands, and the P.\$4 minimum daily wage established by law.

PROSPECTING IN CHINA

Particularly encouraging is the increasing attention all governments in the region have been devoting to the need for systematic geological surveys and proper prospecting. Last year witnessed the adoption of the first Five-Year Plan in mainland China. Realizing that "poor geological data" did not permit the formulation of concrete proposals for industrial expansion, the authorities concerned announced a 500 per cent increase in prospecting and development operations. A new Ministry of Geology—which is

unique in the region—was established to intensify the exploration work in the mainland. In January, 1953, the Ministry convened a National Conference for the Planning of Geological Work in co-ordination with National Construction. As a result of the conference, it was decided that prospecting for mineral deposits to meet the urgent needs of industrial construction should be a major effort in 1953, while general geological surveying would also take place in preparation for more detailed investigation in 1954. On the other hand, production targets for 1953 were revised downwards; copper from 139 to 129, lead from 149 to 135, and zinc from 154 to 130.

In 1950, there were 29 geological survey teams working in mainland China. The number increased to 87 in 1952 and plans for 1953 envisaged still greater expansion. To meet the tremendous demand for young geologists, the Geological Institutes in Peking and Changchun will be expanded considerably, and six secondary geological schools will be set up. In addition, short-term training classes for drilling, chemical analysis, survey and cartographic work have been established in various parts of China.

GEOPHYSICS ASSUMES INCREASINGLY IMPORTANT ROLE

In Japan geophysical methods have assumed a greater role, and have been applied to prospecting for coal, oil, pyrite, copper, lead and zinc deposits. Spontaneous polarization resistivity and seismic surveys by the Japanese Geological Survey disclosed a pyrite ore body in Oita Prefecture. The Dowa Mining Co. located a pyrite deposit at the Yanahara mine, Okayama Prefecture, by resistivity and self-potential methods. The latter method was also used by the Ishiwara Mining Co. to locate a copper ore body at the Myohno mine, Wakayama Prefecture, and by the Sumitomo Mining Co. in exploring underground workings of the Yoichi mine, Hokkaido, for lead and zinc. A number of electrical and magnetic surveys have been made for iron, tungsten and sulphide deposits at various mines in the Tohoku, Chiba and Shugoku regions. Portable seismic and electrical field equipment was continually being improved, while electric borehole methods were also receiving considerable attention. The trend in Japan is more and more towards improving the accuracy and efficiency of field surveys.

The largest air survey ever made of Pakistan's resources is being undertaken at a cost of U.S. \$2,000,000. The total area covered will be 165,000 sq. miles. The funds are drawn from a \$10,000,000 fund set up by Canada under the Colombo Plan. The survey is scheduled for completion in 1956 and will furnish detailed information on Pakistan's resources, paving the way for the planning of future industrial development.

Early in 1953 a committee representing the Pakistan Mine Owners' Association submitted a memorandum to the Minister for Industries which suggested ways of helping in the development of the mining industry in Baluchistan. The committee recommended better roads and transportation facilities, revised coal prices, granting of permission to

buy truck tyres, and suspension of restriction on chromium and on prospecting rights and leases.

The first detailed geological survey of the kingdom of Nepal was being made by a Swiss geologist on assignment for the United Nations Technical Assistance Administration. The expert examined nine mines and four special projects during the year. It was estimated that the survey would not be finally completed until the autumn of 1956 or the spring of 1957. For lack of transport facilities all the field work had to be done on foot. The mineral resources so far known are located in regions where roads are mostly non-existent.

An aerial survey and geological mapping of Nepal is being carried out by the Indian Survey Department at the request of the Government of Nepal. The survey of the valley of Kathmandu has been completed and mapping work is now in progress on the basis of aerial photographs.

FOREIGN ENTERPRISE RESTRICTED

The countries of the region are generally in favour of the development of mineral resources under their own auspices, but have permitted foreign enterprise when it was considered necessary. In Thailand, the government decided

that mining concessions could be granted to foreigners only if development was beyond the capital and technical knowledge of the country's subjects.

An important mining policy decision was implemented by the Government of Indonesia on March 1, 1953, when it took over the operational management of the tin mines in Banka Island from the Dutch Billiton Co., which supplied the major sources of Indonesia's total tin output. During the year the State Mining Commission of Indonesia was reported to be preparing the draft of a new mining law. Among the issues under consideration were the nationality of the mining companies, ownership of the mineral deposits, division of profits between government and company, settlement of disputes, and regulations controlling mining operations.

A substantial improvement is noted in the mineral production of the region as a whole. In 1952 coal production reached 148,000,000 tons, and the iron ore output was about 25,000,000 tons, both being post-war records. Tungsten, manganese, chromium and tin production remained at about the 1951 level, while aluminium production showed some increase. This trend was expected to continue into 1954, though tin and tungsten production is likely to fall.

Tin and the Belgian Congo

In the following note our Brussels Correspondent studies the tin outlook from the viewpoint of the Congo and Ruanda Urundi producers.

During 1953 tin maintained its position as third in economic importance among the products of the Belgian Congo and Ruanda Urundi (the latter state being under Belgian Trusteeship). This was also the position in 1952, when tin came next in importance to copper and cotton.

It must, however, be realized that the economic value of tin was kept at this high level largely owing to the contract which was still in operation between the Belgian Congo and Ruanda Urundi, and the Reconstruction Finance Corporation under which the Belgian Congo producers were enabled to sell to the American Government about half their output of tin at 120½ c. per lb. of tin metal. This agreement, which covered tin in ore and metal, shipped from the Congo and Ruanda, was only in force up to December 31, 1953, and now that this contract is at an end, there are several other factors which must be taken into account when assessing the future. The price of tin fell heavily during the past year, from £980 per ton to £566. Furthermore, at the International Tin Conference, held at Geneva during November of last year, which was summoned with the purpose of helping tin producers to keep the price of tin at an economic level, Mr. Nichols, the United States delegate, stated that the U.S. strategic stockpile of tin would, by March, 1954, have 38,000 to 40,000 tons of tin in excess of requirements. This would mean that not only would the U.S.A. no longer be in the market for the purchase of tin, but that they might even consider selling their surplus stockpile tin. A draft agreement was eventually drawn up by the Conference, which laid down a floor price of 80 c. (£640) and a ceiling price of 110 c. (£880) for tin, but this agreement has still to be ratified by the governments of the various producer and consumer countries. (See *Mining Journal*, December 11, 1953, page 696.)

So far as the Congo and Ruanda Urundi are concerned, \$1 is the minimum price at which tin could be produced at an economic level, allowing for output being reduced by 25 per cent to avoid over production. This minimum pro-

duction cost was disclosed by the representative of the Belgian Congo and Ruanda Urundi at a meeting of the International Tin Conference which took place on November 18. Two days later, however, this same delegate said that tin production in the Belgian Congo and Ruanda Urundi was in danger once tin fell below 119 c. The position facing the tin mining industry in the Belgian Congo and Ruanda Urundi is therefore not very bright.

IMPORTANCE OF REDUCED COSTS

Tin producers, of course, are doing, and will continue to do, their utmost to reduce production costs, by improving production methods, not only in order to safeguard their investments, but also to maintain the standard of living among their native workers, which has been raised during recent years. Mr. Leynen, one of the managers of "Geomines," has given as a further reason the metal's importance to the economic stability of the Belgian Congo and Ruanda Urundi. Tin is, as has been said, the third most valuable product of the country, and Mr. de Paeuw, assistant director of the Congo Mines service, recently stated that 1,000,000 natives, including miners, food producers and transport workers and their families are dependent on tin for their livelihood.

Tin quotations in the United States of America, the biggest consumer of tin in the world, are now a little above 80 c. so that the position of the Colony's tin producers, particularly of small producers, is becoming very serious. To help them, the Colony's government has just revised the export duty on tin ingots and ores from 11 per cent to 7 per cent, this reduction in duty to take effect as from January 1, 1954. This measure, however, is insufficient to change the position materially, and transport charges and other industries associated with the tin producers should also be prepared to do something to ease the position.

Extent of Danger from Rock Drill Dust in U.S. Coal Mines

During a survey conducted by the U.S. Bureau of Mines to determine the extent of the hazard to mine workers from dust produced through intermittent rock drilling in coal mines, eighteen mines were visited and thirty different operations observed. The following article is a condensation of the findings and recommendations arising from this survey, published as U.S. Bureau of Mines Report of Investigations 5004, by Messrs. C. W. Owings and L. Johnson. The authors are mining engineers of the Accident Prevention and Health Division of the Bureau.

The survey demonstrated that rock drilling in coal mines, even for short periods without dust control, presents a health hazard, as men working at the drills or in the path of return air from the place where drilling is done may be exposed to high concentrations of silica-bearing dust. Even though the Federal Mine Safety Code permits the use of dust respirators for short periods, their use should be restricted to situations in which it is not feasible to control dust by other means. Dust should be controlled at its source, by using wet drilling or approved dust collectors, rather than permitting it to escape into the general atmosphere of the working place and then attempting to provide protection by using respirators. During this survey of intermittent drilling, the exposure time per shift ranged from 7 minutes to 6 hours 46 minutes. It was difficult to classify any particular type of operation as short-time or long-time drilling, as the exposure times varied widely.

Excessive concentrations of dust were encountered during all types of power drilling and with all observed conditions of ventilation. Generally, electric and hydraulic drills produced less dust than pneumatic drills and were used near the face, whereas the pneumatic drills were used for heavier work along the haulageways.

SAMPLING AIR-BORNE DUST

Air-borne dust samples were collected with a Bureau of Mines midget impinger. Samples were collected at the breathing zone of the drill operators before, during, and after drilling, and were also collected at various distances outby the drill, usually at the first open crosscut, during and after drilling. The purpose of taking these latter samples was to determine concentrations of dust that were being carried downwind and that might affect other workers.

The free-silica content of a rock is determined most accurately by the X-ray diffraction method, which is based upon the specific diffractive properties of crystalline substances. This method requires only a small sample, and the small particle size of industrial dust does not affect the results adversely. The method is now used for quantitative analysis of samples of rock, rock dust, drill cuttings, and air-borne dust. Many types of rock strata with wide variation in free-silica content were encountered in this study. The lowest percentage of free-silica, 6 per cent, was encountered in limestone (bottom rock), whereas the highest, 72 per cent, was found in sandstone (roof rock).

Experiments were divided into two categories, one in which no positive ventilation was provided at the drill and the other in which a ventilating current passed over or near the drill. Fifteen operations were observed in each group, and dust concentrations at the drill ranged from 12,000,000 to 4,531,000,000 particles per cu. ft. of air. The average with no positive ventilation was 586,000,000 particles, and with positive ventilation the average was 488,000,000 particles. With the exception of hand-drilling for trolley hangers, all operations observed produced concentrations over the recommended maximum. High concentrations were also carried downwind, exposing other workmen in many instances.

Drilling in draw slate in 10 mines produced dust concentrations from 25,000,000 to 609,000,000 particles per cu. ft., with an overall average of 254,000,000 particles. It is interesting to note that during the drilling that produced the highest concentration, water was sprayed on the collar of the hole. All drilling in draw slate was done by either electric or hydraulic drills.

DRILLING IN TOP AND BOTTOM ROCK

Drilling in top rock for brushing and grading was done in eight mines; in six mines pneumatic drills were used, and in two mines electric drills were used. Dust concentrations ranged from 26,000,000 to 4,531,000,000 particles per cu. ft. of air, with an overall average of 684,000,000 particles per cu. ft. The great variation in the concentrations were due mostly to the different ventilating conditions encountered. Samples were collected while drilling with hydraulic rotary drills in the coal face at two locations where water was sprayed onto the collar of the hole. With ventilation in effect, dust concentrations averaged 271,000,000 particles per cu. ft. of air; with no positive ventilation the concentrations averaged 300,000,000 particles per cu. ft.

Bottom was being drilled with pneumatic drills in four mines. The dust concentration ranged from 82,000,000 to 3,098,000,000 particles per cu. ft. of air, with an average of 782,000,000 particles. The highest concentration was produced while drilling in limestone at the rate of 0.2 f.p.m., with ventilating current at a velocity of 155 f.p.m. and a volume of 7,000 cu. ft. per min. passing over the drill.

Two sets of samples were collected while vertical holes were drilled with pneumatic drills for an overcast. Volume of air at this point was 37,700 cu. ft. per min., and drilling was in sandstone at the rate of 0.83 ft. per min. The samples collected upwind at the drillers' breathing zone averaged 178,000,000 particles per cu. ft. of air, and those collected on the downwind side of the drill contained 1,082,000,000 particles of dust per cu. ft.

Although this was a study on short periods of drilling, drilling for roof bolting in one mine was included. There was no positive ventilation at the face, and the dust concentrations averaged 1,895,000,000 particles per cu. ft. of air, ranging all the way from 12,000,000 to 3,789,000,000 particles per cu. ft. Drilling was done with a pneumatic two-drill jumbo at the rate of 1.1 f.p.m.

NECESSITY FOR DUST CONTROL

The foregoing results merely confirm what has been generally known for some time. That is, that any type of drilling will result in high dust concentrations when dust control is not practised. Ventilation will assist, but is not in itself sufficient to reduce the concentrations to safe limits.

The most important consideration in intermittent drilling is the total time during which the driller is exposed each shift. During drilling in draw slate the exposure time ranged from 19 minutes to 2 hours 36 minutes, with an

average of 1 hour 18 minutes per shift. The exposure while drilling top rock for brushing and grading ranged from 7 minutes to 2 hours 39 minutes a shift, with an average of 59 minutes. A total of 24 minutes a shift was consumed while drilling coal in one section of a mine and 48 minutes in another.

Drilling for the overcast resulted in high exposure times per shift, 3 hours 2 minutes and 4 hours 31 minutes per shift, respectively, for the two sets of samples collected. Usually one or two overcasts will be constructed each year, depending on the rate of advance and methods of ventilation.

Drilling in the bottom in four mines resulted in exposure times of 27 minutes to 6 hours 46 minutes per shift, with an average of 3 hours 2 minutes per shift. The roof bolting observed in one mine showed total exposure time of 1 hour 53 minutes per shift.

ALLOWABLE DUST CONCENTRATIONS

The U.S. Bureau of Mines has made the following tentative recommendations on allowable limits of air dustiness:

In bituminous-coal and lignite mines the average full-shift concentration of atmospheric dust to which a workman may be exposed should not exceed 20,000,000 particles per cu. ft. of air, and a maximum concentration

for any single operation should not exceed 40,000,000 particles of dust per cu. ft. of air. When the dust contains silica, not more than 5,000,000 particles of silica dust per cu. ft. of air should be present in the above limiting concentrations. The dust count may be multiplied by the percentage of silica concentration, and if the result is less than 5,000,000 the dust concentration will be considered safe. The above limiting concentrations are based on impinger samples in which light-field counts are made under a microscope.

The following threshold limit values were adopted at the meeting of the American Conference of Governmental Industrial Hygienists in Cincinnati, April, 1952, and are based upon average exposure throughout a working shift.

Silica Content	Million particles of dust per cu. ft. air
High: above 50% free SiO ₂	5
Medium: 5 to 50% free SiO ₂	20
Low: below 5% free SiO ₂	50
Total dust: below 5% free SiO ₂	50

Dust produced by drilling must be arrested or collected at its source if it is to be controlled adequately. This can be done by means of water properly applied or by using a dust collector. Water can be used effectively with pneumatic percussion or hydraulic rotary drills, and dust collectors can be adapted to any type of drilling equipment.

Discovery of Oil in Western Australia

The discovery of commercial oil in Western Australia may yet prove to be an event of marked importance in Australian mining history. Australia has hitherto been entirely dependent on imported oil with present day importations approximately 12,800,000,000 gallons per annum. In the following article, received under recent date from our Australian correspondent, a comprehensive picture of the western area discovery is given, together with a summary of other potential oil deposits in various states of the Commonwealth.

Attention was directed to the possibility of oil in Western Australia by the discovery in the Fitzroy Basin, in the far north, of waxy and bituminous residues in outcropping Palaeozoic rocks, in the year 1919. In the early twenties, the Commonwealth Government subsidized the Freney Oil Co., formed to prospect the area. Drilling was carried on at intervals, until, in 1941, the deepest bore drilled to that date, was abandoned at 4,712 ft. owing to war-time conditions. Showings of oil had been reported.

The North-West Basin in the Exmouth Gulf region, 700 miles north of Perth, was examined by Dr. F. G. Clapp in 1925 and condemned. In 1934-35, Oil Search Ltd. an Australian company made surveys and decided that the rocks were not generally unfavourable, as reported. Financial resources were inadequate for the exploratory work to be faced but in 1948 the Bureau of Mineral Resources, Geology and Geophysics, together with the Geological Survey of Western Australia, commenced the work of assessing the oil possibilities of this region. Mapping, geological surveying and geophysical surveys by seismic and gravimetric methods, have been carried on continuously since that year, under the direction of Dr. H. G. Raggatt, Director of the Bureau, now Secretary of the Department of National Development, and their successful issue is directly due to the high standard of the technical work, and to his confidence and perseverance, not only in the actual technicalities, but also in the effort to secure the capital necessary to carry out the great project involved.

All data were put before an Australian company, Ampol Petroleum Pty. Ltd., which took up extensive permits to prospect, ultimately totalling 325,000 sq. miles, and carried out further geological and geophysical work which was fully confirmatory. Efforts to interest overseas capital to supplement the resources of the Ampol Company were

unsuccessful, so Dr. Raggatt advised the Commonwealth Government to purchase a modern drilling rig, capable of reaching a depth of 15,000 ft., and to drill the area in event of failure by private interests to raise adequate capital. The plant was purchased at a cost of £A320,000, and was the culminating stage of Dr. Raggatt's far-sighted policy. By that time, however, Ampol Petroleum was joined by the American Caltex organization, the interests of the two groups being ultimately merged in the formation of a Sydney company, West Australian Petroleum Ltd. Drilling was commenced in September, 1953, and oil was struck at a depth of 3,605 ft. in November.

PLANS FOR EXPANSION

However, the company's No. 1 bore, operating at Rough Range, Exmouth Gulf, has now been reported to have reached a depth of 6,000 ft., and there is expectation that the next oil horizon may be at about 7,000 ft. This company is proceeding with plans for extension of its exploratory operations; No. 1 bore will be continued, and three new bores are planned. One of these bores will be on the Coast Range structure, 40 miles from No. 1 bore; the second will be at Derby, in the Fitzroy Basin, 700 miles north-east from the bore now being drilled, and the third will be on the Rough Range structure itself. Drilling will begin as soon as 15,000 tons of new equipment can be obtained, the bulk coming from the United States.

Geological and geophysical work in the North-West Basin has located, in the vicinity of Exmouth Gulf, seven major structures. The most important, as so far known, are the Cape Range structure, 80 miles long by 20 miles wide; the Rough Range structure, selected for the first test bore, a small symmetrical fold on the east limb of the Cape Range anticline; while further south is the Giralia-Cardabia

structure and others are to the south of that formation again. The country is arid, of low relief, is devoid of permanent surface water, and is occupied by large sheep and cattle stations.

The North-West Basin comprises sedimentary beds of Devonian, Carboniferous, Permian, Jurassic, Cretaceous, Eocene, Miocene and Pliocene age, and the geophysical surveys proved the total depth of the beds to exceed 20,000 ft., instead of 7,000 ft. as originally supposed. These rocks outcrop on the eastern margin of the Basin, 60 miles distant. Source beds in the Palaeozoic marine limestones are reported as highly fossiliferous; the sediments were deposited under shallow water conditions, and sufficiently rapidly to prevent sorting and cleaning by wave action, with a rapidity of sedimentation favourable to the preservation of organic matter. Evidence of reservoir rocks and cap rock is regarded as satisfactory. Regarding the Cape Range anticline, with which the Rough Range structure is closely allied, conditions for retaining oil are stated to be almost perfect and it is expected that the Cape Range fold, superficially in Tertiary limestone, will be continued in the underlying Cretaceous and Jurassic rocks, and that in the Palaeozoic rocks the fold may be still more pronounced for it is considered that the folding has probably been produced by the upthrusting of a fault wedge of the Pre-Cambrian basement rocks.

The oil struck in the Rough Range structure at a depth of 3,605 ft., is high grade paraffin base oil, and tests showed a flow at the rate of 20 bbls. per hour. The well is not to be brought into production yet, as deeper objectives are the ultimate goal of the work.

OTHER PETROLIFEROUS PROVINCES

Other Australian petroliferous provinces, which have received attention in the past, or which are considered to warrant exploration, are summarized below.

In Western Australia, the rocks of the Fitzroy Basin are described as generally similar to those of the North-West Basin, and plans are now being finalized for resumption of drilling. The Bureau of Mineral Resources is continuing geological and geophysical work in that region, as well as in the North-West Basin to both north and south of Exmouth Gulf. The Eucla Basin in the south-east of the State, in Tertiary limestones, is shared with South Australia. At the extreme north end of the Western Australia - Northern Territory boundary is the Bonaparte Gulf Basin, a relatively small area of similar character to the Fitzroy Basin.

A projected venture is under way in Western Australia, the proposed capital being £A5,000,000. Applications have been made to the government for country adjacent to West Australian Petroleum Co.'s concessions at Exmouth Gulf, covering 10,000 sq. miles, 20,000 sq. miles in the Fortescue River country, and 30,000 sq. miles in the Eucla Basin, on the Western Australian - South Australian border. In addition application has been made to the Queensland Government for a concession in the Springsure district inland from Rockhampton.

South Australia has three provinces, the Eucla Basin, a basin in the south-east corner of the State, extending into Victoria, both of Tertiary age, and the Great Artesian Basin in the north-east, shared with the contiguous States of New South Wales and Queensland, and examined to some extent by Frome Broken Hill Ltd. This area is Mesozoic, for the main part Cretaceous in age. Victoria has two provinces, one in the south-west corner, at Nelson, where drilling reached a depth of over 7,000 ft. and was stopped while still in Tertiary beds, the second in the Lakes Entrance Basin where some 50 bores were drilled in Tertiary rocks,

to a maximum depth of about 1,400 ft. Approximately 100,000 gallons of low grade crude oil were produced here, but the occurrence was not of commercial importance. Recent geophysical work, to the east of Lakes Entrance, has located an anomaly which is regarded as important and drilling will probably be commenced at an early date, using a plant owned by the Department of Mines, capable of reaching a depth of 10,000 ft. Apart from the north-west corner of the State, already mentioned, the most promising potential petroliferous area in New South Wales is what has been termed the Sydney Basin, extending from that vicinity for some 200 miles to the northward, and comprising Permian marine sediments underlying the extensive Permian coal measures. Some drilling for natural gas has been done in the basin, and work is to be resumed.

Last year, the Commonwealth Government carried out a magnetometer survey over parts of Gippsland district, and members of the Bureau of Mineral Resources will commence a new search for oil this month. The secretary of the Victorian Department of Mines has stated that the results of the magnetometer survey are so interesting that he has called an immediate conference to plan further ground work. The anomaly revealed is stated to be similar to those which gave the clue to the oil occurrence in Western Australia. The field staff of the Bureau will be reinforced by the Victorian geological staff, and a seismic survey will be carried out.

POSSIBLE IMPORTANCE OF QUEENSLAND

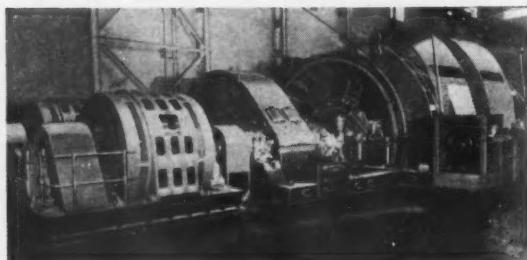
Following Western Australia, Queensland is the State with, apparently, the greatest promise for oil discovery. There are three major provinces: the Gulf of Carpentaria Basin in the north, where two companies propose to commence immediate work, one being Frome Broken Hill, in which Zinc Corporation Ltd. has a large share; the Eromanga Basin in the west and south-west, covering part of the Great Artesian Basin, in which drilling for water located waxy and bituminous material; the Roma-Surat Basin in the south of the State; a subsidiary basin at Maryborough, and a recently reported dome at Springsure, in the central area. Roma has attracted much interest and the greater part of exploration for oil in the State has been done in this area. Expenditure in Queensland has, so far, totalled £A1,750,000. Roma is of interest as being the site of the first located indication of oil in Australia. Natural gas in large volume was struck in a water bore in 1900; some years later an unsuccessful attempt was made for its utilization, and still later a quantity of petrol was extracted in an absorption plant. Subsequent drilling located showings of oil with, in one case, production of 10 gallons per day, at a depth of 3,447 ft. The petrol content of natural gas tapped was from 1.2 to 1.6 gallons per 1,000 cu. ft. The rocks comprising the several provinces are in general, Mesozoic, mainly Cretaceous and Jurassic in age. At Roma the source of the petroliferous gas is uncertain; it is now considered that the source is not in the Mesozoic basal beds, but it has migrated from underlying Permian marine sediments.

Following the Exmouth Gulf success, it is probable that all these petroliferous provinces will receive renewed attention, under conditions much more favourable to proper proving than in the early years of oil exploration. Legislation has been revised in comparatively recent years, to encourage large organizations in the search, whereas earlier legislation, based on metalliferous mining, permitted small leases only and encouraged the small operator only. Now adequate capital and strong organizations are attracted, and the Commonwealth Government and most State Governments have strong geological and geophysical staffs engaged in widespread investigation.

MACHINERY AND EQUIPMENT

A.C. Mine Winders in the O.F.S.

Of late, the development of dynamic braking has led to the increased use of A.C. induction motors for driving large mine hoists. A recent example is the 4,500 h.p. equipment installed at the No. 1 shaft of the Virginia Gold Mining Co. in the Orange Free State, which is one of three similar winders supplied by Metropolitan-Vickers to the Anglo-Transvaal Consolidated Investment Co. Ltd. This installation comprises a 14 ft. dia. double-drum winder driven through gears by two 2,250 h.p. (5,625 h.p. peak) 490 r.p.m. 6,600 volt type A.I.F. induction motors; it is equipped with the latest Metropolitan-Vickers transductor-controlled dynamic braking system.



The 4,500 h.p. equipment at No. 1 Shaft, Virginia Gold Mining

An interesting lay-out is employed in this installation, all the auxiliary equipment for the control of the winder being assembled on a single winder auxiliaries control board. This arrangement lends itself to a neater lay-out of the equipment in the winder house, and it also cuts down the external cable connections between various items of equipment.

An Effective Range of Roof Bolts

One of the most interesting contributions to the technique of underground mining during the last decade has been the development of roof bolting, which has become prominent after much experimental work. The techniques and principles of the practice have already been fully described in *The Mining Journal* on various occasions last year.

Victor roof bolts, manufactured by Victor Products (Wallsend) Ltd., have been designed specially for use with rotary drilling methods, and the manufacturers state that these units require no impact for tightening and that no percussive hammers are therefore necessary. Each bolt consists essentially of three main items: first, the bolt itself is provided with forged tapered end and .75 in. Whit. thread for tightening; second, two split half clamps sliding on the forged bolt and provided with corrugated outer surfaces for effective grip on the strata throughout the life of the bolt; and third, a rubber ring around the clamps to secure initial tightening. The bolt unit is completed by a .75 Whit. nut and square washer to suit the particular roof conditions.

The Victor bolt fits a 1½ in. dia. hole as drilled by a standard rotary drilling bit, the hole being drilled approximately 1 in. beyond the overall length of the bolt. The bolt is then inserted in the hole with the nut and washer in place on the bolt, the nuts being engaged to the extent of approximately three complete threads only. The bolt should be pushed as far into the hole as the washer will allow and then pulled back, when the rubber will hold the clamps until the tapered end of the bolt expands them to grip the strata. It will then be found that the threads in the nut will be fully engaged when the designed torque of 150 lb./ft. has been applied to the nut to secure full tightening of the bolt. In general it can be said that 10,000 lb. is the correct installed load on each bolt of .75 in. dia.

The manufacturers claim that this patented type of bolt holds certain advantages. These are that the absence of a slot in the end of the bolts enables a .75 in. dia. bolt to be used having the same resultant strength as a 1 in. split wedge type, thus resulting

in a 43 per cent saving in the amount of steel required for identical roof support, and that the large area of contact of the two split clamps provides a more effective grip in weak strata than the split wedge type. Furthermore, no percussive hammers are required for driving the wedge home as in the split wedge type and tightening can be carried out with the same equipment used for drilling.

Due to the action of the rubber ring, the clamps grip the strata as soon as an attempt is made to withdraw the bolt from the hole, while as soon as the bolt is inserted into the drilled hole, straps or beams can be supported, the final tightening being when all the bolts are in place. It is interesting to realize that the length of the drilled holes does not need to be accurately controlled, as in the split wedge type of unit, because tightening of the bolt does not depend on the position of the end of the hole. The hole must, of course, be drilled deep enough to enable the washer or strap to be clamped against the roof, and the projection of the bolt end below the roof can be accurately controlled.

For experimental purposes, or where the amount of roof bolting is inconsiderable, satisfactory drilling is claimed by the adoption of standard Victor rotary drilling equipment.

Speeding Up Coal Transport

The introduction of a diesel tractor is expected to result in considerable improvements in the speed and ease of handling coal at the Onllwyn Colliery of the Welsh Region of the N.C.B. The tractor used is the type AM 160 T model made by Lansing Bagnall Ltd. It develops a 36 b.h.p. at an engine speed of 2,000 r.p.m., at which speed the tractor will travel at 10½ m.p.h. and give a draw bar pull of 4,000 lb. For towing empties, the engine can, if necessary, accelerate to 3,250 r.p.m., giving the tractor a road speed of about 20 m.p.h.



AM 160 T model drawing 18 tubs

The introduction of tractors may result not only in a speeding up of transport but may also simplify the track system at many collieries owing to the fact that these units do not need a horizontal plane for efficient operation as does the traditional pit pony. The fact that a greater number of tubs can be moved at greater speeds in the same time is an obvious improvement, while in addition diesel tractors require practically no maintenance.

A further advantage of tractors is their flexibility compared with locomotives, for they are independent of rails so that, when not engaged on towing tubs, they can be used for other duties. The pneumatic tyres of a tractor also give a greater coefficient of friction than the steel tyres of locomotives.

METALS, MINERALS AND ALLOYS

Widespread uncertainties regarding the course of trade and industry more particularly in the United States, to say nothing of Mr. Molotov's intransigence in Berlin, continued to render any forecast of the trend in metals perplexing.

President Eisenhower's Budget is expected to encounter big opposition in Congress. The President's economic advisers are reported to be more alarmed about depression talk than about evidences of any business decline. However, as the *Wall Street Journal* points out this week, new orders for brass mills are 30 per cent under those at the same time last year; cancellations for finished and semi-finished lead producers are being reported; and stocks of zinc increased by just under 18,000 s.tons in January to 198,792 s.tons, the highest total since October, 1946.

COPPER.—The U.S. copper price has remained steady at 29½ c. and seems likely to remain unchanged at least until the Chilean Congress reconvenes early next month. Sales for February shipment have been developing much better than last month with 40,000 tons already sold against 70,000 tons for the whole of January. Meanwhile productionwise, sentiment is governed mainly by news from Chile and Rhodesia. As regards the former, there appear to have been no developments since those reported here last week.

In Rhodesia, the strike at the Wankie collieries, by threatening a substantial reduction in current output on the Copperbelt, has been a sustaining influence on the international market. At one time shipments of coal were restricted to the requirements of the railways and power stations; however, the Wankie Company was able to report at the week-end that a large proportion of the strikers had returned to work and that, with the company's concurrence, the Government would appoint an independent board of inquiry into the strike. This has since been appointed and in addition a second Board has been set up to advise the Minister of Native Affairs on working conditions at Wankie. With the reorganization of labour and other arrangements necessary several weeks are likely to elapse before normal full-scale production can be resumed at Wankie.

The Economic Secretary to the Northern Rhodesian government stated on Tuesday last that 3,000 tons of coal were being despatched to the Copperbelt and this would be followed by minimum daily shipments of 2,000 tons. Earlier it was reported that shipments to the Belgian Congo were suspended for a month.

LEAD AND ZINC.—U.S. lead-zinc producers continue to make every effort to obtain increased tariffs, and are also considering various import quota and subsidy schemes. Latest move on the part of the producers in their efforts to obtain government help has been the setting of February 16 for President Eisenhower to receive a bi-partisan group of four senators to discuss the "distressed conditions" in the industry. The meeting is understood to be exploratory and there is no intention at this stage of inviting the White House to adopt any specific plan. Prompt lead has been in fairly good demand this week at 13 c. New York but the American market remains very sensitive to foreign prices. The extent of the falling-off in consumption during the autumn now becomes more apparent with the publication of the November figures which amounted to 88,178 s.tons compared with 102,934 in October.

Reports regarding zinc are generally rather gloomy. U.S. stocks showed an increase of some 18,000 s.tons in January to 198,798 s.tons, believed to be a record smelter holding. Shipments were less than in December. Partial shut downs at smelters are becoming widespread—the National Zinc Co. attributing their output cut to unsatisfactory economic conditions in the industry. U.S. buying has remained slack at 9½ c., being confined to immediate requirements.

TIN.—Output figures for December for the world's chief producers are the chief item of interest this week and further confirm earlier forecasts put forward in these columns that world output was not likely to show any decrease in 1953, especially since tin prices have again improved. Also it is now possible to estimate fairly closely the probable extent of last year's production surplus. World mine production was approximately 178,000 tons compared with 171,000 in 1952. De-

tails for the main producing countries are as follows:

Country	December 1953	Jan.-Dec. 1953	Jan.-Dec. 1952
Belgian Congo	2,571	17,153	13,320
Bolivia*	2,800(e)	34,649	31,950
Indonesia	3,146	33,753	35,003
Malaya	5,201	56,255	56,829
Nigeria	657	8,203	8,311
Thailand	900(e)	10,144	9,471

* Figures represent exports and not production. e Estimated.

Consumption again lagged behind 1952. In that year consumption totalled 130,500 tons and it may well be that year end figures for 1953 will be as much as 1,000 tons down over that total, despite United States consumption increasing by some 10,000 tons to around 55,000 tons, no doubt reflecting the first full year of freedom from domestic restriction. It is, however, very ominous to see that consumption in all the other main consuming countries has fallen off considerably without any large-scale reduction in industrial activity to account for it. Thus in the case of the United Kingdom, consumption last year only amounted to 18,634 tons against 22,554 in 1952, the fall occurring principally in consumption for tinplate, and in whitelmet, bronze and gunmetal alloys. Moreover this is no isolated phenomenon as a decrease of similar proportion has occurred in Western Germany while consumption in the Netherlands is down by 50 per cent over 1952 although this was a year of exceptionally heavy consumption.

The United States made considerable progress in tin conservation during the years of domestic restriction, and it may well be asked whether the consequence of this improved know-how is as yet fully reflected in industrial consumption this side of the Atlantic.

In the light of these statistics optimism regarding tin prices depends on the adoption of the report of the Geneva Tin Conference by the U.S. Administration. It is reported that efforts are now being made through diplomatic channels to obtain assurances of a benevolent neutrality in the management of the U.S. stockpile, widely assumed to be of the order of 200,000 tons. The Business and Defence Services Administration has called a consumers' conference for February 25 to consider the International Tin Agreement proposals.

Fears that Congress may move to close the Texas Smelter are reported to have caused considerable alarm in Bolivia and to a lesser extent in Indonesia. Sr. Juan Lechin, Bolivian Minister of Mines, is stated to have resigned but the Government is seeking to persuade him to stay at his post.

ALUMINIUM.—The aluminium industry continues, in marked contrast to the other metals, to record steadily increasing outputs and new plant installations. A subsidiary of the Reynolds Metals Company has now nearly completed an alumina plant at La Quinta in Texas close to the San Patricio reduction plant. Operations at the plant have commenced and output will eventually reach 1,000 tons of alumina per day. The plant is specially designed to refine Jamaican bauxite and now provides Texas with a completely integrated bauxite to aluminium operation.

Reynolds has also opened a new aluminium production plant near Arkadelphia, in Arkansas, to have an annual rated capacity of some 55,000 s.tons of metal raising the company's total capacity to 414,500 s.tons.

Canadian exports established another record last year with the U.S. displacing the U.K. as a principal recipient, partly due to the release to the U.S. of Canadian material previously purchased here. Exports to the United States are computed as 220,000 tonnes (104,100 in 1952). The scarcity of aluminium supplies affecting independent fabricators made them eager buyers to the extent of 130,000 tonnes. Exports to the U.K. last year are computed at 170,700 tonnes (234,300 in 1952). U.K. demands are said to be running ahead of last year's rate and shipments at least equal to last year's figures are predicted.

MAGNESIUM.—Although the production of primary magnesium in the States last year was down by over 12,000 s.tons on 1952 at 93,075 s.tons, the supply position has eased to the point where the Bureau of Foreign Commerce removed quantitative restrictions on exports last month, although destinations are still subject to security control.

TITANIUM.—Du Pont are working out a scheme with the U.S. Government for the design of a new plant to produce between 7,000 and 8,000 tons of titanium sponge annually. The company is spending about \$600,000 on initial design and engineering research and following this will proceed with the construction of a \$30,000,000 plant, probably in Tennessee, provided that satisfactory basis of financing can be worked out with the government.

The Armour Research Foundation of the Illinois Institute of Technology has announced the development of a method for producing titanium alloy ingots weighing up to 100 lb. by means of a double melting process. The development is described as applicable to commercial-scale production.

Iron and Steel

By a curious synchronization of events further questions in Parliament upon the shortage of steel plates coincided with an announcement by the British Iron and Steel Federation of a cut of £5 per ton in the export price of this particular product. Naturally, the decision has not escaped criticism, but it is not so utterly irresponsible as it would appear to be at first sight.

Plates may still be in short supply, but an equation between output and home demand is in sight. Since 1946 plate production has been increased by 50 per cent and reached the record figure of 2,400,000 tons last year. No less significant is the fact that exports of steel plate were reduced by 100,000 tons last year.

To continue the quantitative and price restrictions on exports in the altered conditions of to-day would be to jeopardize our foothold in foreign markets. With a full knowledge of the fact the Federation has decided to reduce prices but the foreigner will still be required to pay £38 per ton for mild steel plates which are now being supplied to British shipbuilders for £30 6s. 6d. It may not be long before these export premiums disappear altogether, but in the meantime there is a lucrative margin of profit for the British manufacturer and home consumers must take it on trust that their legitimate needs will not be neglected.

As steel production expands, so does the volume of imports continue to shrink. But the rise in pig iron production which amounted to nearly 500,000 tons last year has not kept pace with the requirements of the melting shops and regular shipments of Russian basic iron are now arriving in South Wales ports at a price which is stated to be about £2 per ton more than the fixed home quotation of £14 6s. 6d.

Generally the tone of the iron and steel market is very strong, and if not abandoned, fears of a recession are no longer openly expressed.

The London Metal Market

(From Our Metal Exchange Correspondent)

This week has seen little change in price levels, the undertone having been consistently good throughout the period.

News from America continues to be of a fairly encouraging nature, with demand for copper and lead running at a very good level, whilst the price of zinc is being bolstered up by daily announcements of curtailment in production. This latter factor will, of course, take several months to affect the position, but it is a sign that producers are prepared to fight for a minimum price of about £70 per ton.

In Europe buying of copper continues, and very full prices are being paid for prompt metal whilst metal for delivery as late as June/July is in good demand. The market for lead is quiet with prices ruling at about the level of the London cash quotation for delivery ex-smelter. The demand for zinc has been considerably lessened by the inability of German importers to obtain foreign currency, and it is expected that this situation will continue for at least two months. Elsewhere demand has been only moderate.

During the week the Committee of the London Metal Ex-

change published the amended lead contract which will come into force for all "prompts" falling after the May settlement. The one major alteration which has been made has as its purpose the making of the market more attractive to consumers, and is aimed at shortening the period during which deliveries can be made. This is brought about by introducing two settlements a month and shortening the permitted time of delivery after the settlement day. The settlement dates on the new contract are the first market day of the month in respect of the second half of the previous month and the sixteenth calendar day of the month (or the nearest market day thereto) in respect of the first half of that month, and delivery should always take place within three weeks of the settlement date.

On Thursday morning the Eastern price for tin was equivalent to £650 per ton c.i.f. Europe.

Closing prices and turnovers are given in the following table:

	February 4 Buyers	Sellers	February 11 Buyers	Sellers
Tin				
Cash	£650	£652½	£655	£656
Three months	£630	£632½	£635	£636
Settlement		£652½		£656
Week's turnover	405 tons		310 tons	
Lead				
Current month	£811	£812	£82½	£82½
Three months	£811	£812	£81½	£82
Week's turnover	1,975 tons		3,950 tons	
Zinc				
Current month	£71½	£72	£72	£72½
Three months	£70½	£70½	£70½	£70½
Week's turnover	2,600 tons		7,075 tons	
Copper				
Cash	£225½	£226½	£228½	£229
Three months	£212½	£213	£214	£214½
Settlement		£226½		£229
Week's turnover	5,650 tons		4,200 tons	

OTHER LONDON PRICES—FEBRUARY 11

ANTIMONY

English (99%) delivered,			
10 cwt. and over	..	..	£210 per ton
Crude (70%)	£200 per ton
Ore (60% basis)	22s./24s. nom. per unit, c.i.f.

NICKEL

99.5% (home trade)	£483 per ton
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OTHER METALS

Aluminium, 99.5% £156 per ton	Osmiridium, £40 oz. nom.
Bismuth	Osmium, £65/£70 oz. nom.
(min. 4 cwt. lots) 16s. lb.	Palladium, £7 15s./£8 10s. oz.
Cadmium (Empire), 13s. 10d./	Platinum, £30/£33
14s. 4d. lb.	Rhodium, £42 10s. oz.
Chromium, 6s. 5d./7s. 6d. lb.	Ruthenium, £25 oz.
Cobalt, 20s. lb.	Quicksilver, £63 10s./£64 10s. ex-warehouse
Gold, 248s. f.oz.	Selenium, 30s. 6d. nom. per lb.
Iridium, £60 oz. nom.	Silver 73½d. f.oz. spot and f.d.
Magnesium, 2s. 10½d. lb.	Tellurium, 15s./16s. lb.
Manganese Metal (96%-98%) £225/£262	

ORES, ALLOYS, ETC.

Bismuth	..	..	50% 7s. 3d. lb. c.i.f.
			20% 3s. 3d. lb. c.i.f.
Chrome Ore—			
Rhodesian Metallurgical (lumpy)	£14 5s. 6d. per ton c.i.f.		
" (concentrates)	£14 5s. 6d. per ton c.i.f.		
" Refractory	£13 17s. 6d. per ton c.i.f.		
Baluchistan Metallurgical	..	£15 19s. 6d. per ton c.i.f.	
Magnesite, ground calcined	..	£26 - £27 d/d	
Magnesite, Raw ..	..	£10 - £11 d/d	
Molybdenite (85% basis)	..	102s. 4d.-103s. per unit c.i.f.	
Wolfram (65%) ..	..	World buying 100s. nom.	
Scheelite (65%) ..	..	145s. nom. U.K. Selling	
Tungsten Metal Powder ..	..	140s. nom. U.K. Selling	
(98% Min. W.)	..	13s. 8d. nom. per lb. (home)	
Ferro-tungsten ..	..	10s. 8d. nom. per lb. (home)	
Carbide, 4-cwt. lots ..	..	£35 13s. 9d. d/d per ton	
Ferro-manganese, home ..	..	£53 10s. 0d. per ton	
Manganese Ore Indian c.i.f. Europe (46%-48%) ..	..	7s. 11d. - 8s. 4d. per unit	
Brass Wire ..	..	2s. 4½d. per lb. basis	
Brass Tubes, solid drawn ..	..	1s. 8½d. per lb. basis	

THE MINING MARKETS

(By Our Stock Exchange Correspondent)

Improved revenue returns, and rumours concerning a further reduction in the bank rate before the budget, caused rises in the gilt-edged market. These, however, may well be optimistic as supplementary estimates are likely to be heavy this year and although both the United States and France have reduced their bank rates, it seems doubtful if the time is yet ripe for the United Kingdom to follow suit.

Kaffirs enjoyed a busy week. Continuations over the end of the account were settled without much trouble and market conditions remained buoyant. Interest was mainly centred in developers and uranians and other issues were rather neglected. For this reason Far West Rand shares such as Strathmore and New Pioneer were prominent with the former particularly so due to its interest in Elatton.

Individual Rand mines were mostly the turn easier, and there were few notable changes. East Champs d'Or are now piping slimes to the Randfontein plant although this has not yet started. The shares improved on the news. Dominion Reefs fluctuated but finished higher on balance. This mine, which will be almost exclusively a uranium producer, is unaffiliated and recent buying has been on such a scale that rumour suggests interest by one of the big finance houses. Vaal Reefs is another mine which market circles think may eventually produce uranium.

The main interest in Kaffirs was directed to the Orange Free State. There was a fair amount of speculative buying, mainly engaged in trying to spot possible new uranium propositions. It is thought that the Union government may shortly sanction an additional list of official producers. In this connection Freddies North, Merriespruit, Loraine, and St. Helena were all talked of and rumour was well reflected in the price of the shares. The rise in St. Helena was undoubtedly helped by the improvement in the January monthly returns. Loraine received some check from the report that a strike ballot would be taken.

next week, unless outstanding wage claims were settled. Harmony were popular on the mine's known potentialities and President Brand jumped sharply on rumours that the recent excellent underground development had been maintained in the New Year.

The West African market remained sluggish despite some interesting quarterly results from the Gold Coast Selection group. Ariston returned record profits, the December figures being £122,744 against £105,740. Bremang did well to hold their profits at £21,227 against £25,531.

Coppers were generally better. Chartered led the way with a big jump following the unexpected increase in dividend. The company are paying 50 per cent against 40 per cent. The market had been afraid that a reduction might have to be made during the next year or so due to the fact that the company's royalties are based on the price of copper. It is clear that the former large E.P.L. assessment will give the company a comfortable tax cushion. Other Rhodesian shares improved when it was known that the Wankie strike had not affected coal supplies as badly as was feared. Tanks were again keenly sought and rose accordingly.

Tin shares were quiet but mostly the turn harder despite the lower metal price. Nigerian columbite producers again recorded a slight improvement.

In the miscellaneous base metals group, Wankie were unchanged despite the end of the strike and more optimistic forecasts of increased production possibilities during the current year. It is understood that the Consolidated Goldfields group are exploring another coal bearing area in Southern Rhodesia with a view to starting a new colliery should results justify this.

Canadian dollar issues were better on the steadier trans-atlantic markets and most of the popular issues recorded gains of one or two dollars.

COMPANY NEWS AND VIEWS

Mufulira and Roan's Large Copper Stocks

The December quarterly results of Mufulira and Roan Antelope copper mines show that the companies have not completely recovered from the necessity to establish "pipelines" to consumers in the U.K. and U.S.A. following on the resumption of free dealings on the London Metal Exchange.

Mufulira expanded her copper sales to somewhere near those for the June quarter with the consequent increase in profits before taxation from £1,074,000 in the September quarter to £1,720,000.

Roan's copper sales were not much more than half that sold in the June quarter although the figure does show up to advantage compared with the September quarter. In spite of the larger revenue received, costs appear to have risen disproportionately with the result that profit before taxation is down.

The feature of the two quarterly reports is that both companies have had to stockpile a considerable proportion of their production which is reflected in the figures given for the value of their copper stocks, but the companies have announced that the smaller deliveries resulting from having to establish pipelines to consumers should be overcome during the remaining six months of their financial year, so that taken on a per annum basis the companies' sales should be normal.

The table compares the results for each quarter of 1953.

	Mar. Qtr. (l.tons)	June Qtr. (l.tons)	Sept. Qtr. (l.tons)	Dec. Qtr. (l.tons)
Mufulira				
Sales	16,156 (£'000)	20,663 (£'000)	10,272 (£'000)	18,133 (£'000)
Revenue	4,152	5,339	2,527	4,079
Costs	1,836	2,535	2,000	2,875
Difference in value of copper stocks	Cr. 30	Cr. 174	Cr. 752	Cr. 732
Surplus	2,346	2,978	1,279	1,936
London Expenses	Cr. 20	3	Nil	Nil
Replacements*	250	250	205	216
Profit before tax- ation†	2,116	2,725	1,074	1,720
Roan Antelope				
Sales	23,012 (£'000)	26,458 (£'000)	12,971 (£'000)	14,749 (£'000)
Revenue	5,853	6,754	3,152	3,337
Costs	2,569	2,989	2,638	2,866
Difference in value of copper stocks	Cr. 17	Cr. 43	Cr. 1,054	Cr. 1,010
Surplus	3,301	3,808	1,568	1,481
London Expenses	Nil	Cr. 16	Nil	Nil
Replacements*	250	250	183	198
Profit before tax- ation†	3,063	3,574	1,385	1,283

* Subject to revision when year's accounts considered.

† Estimated.

Chartered Pays 10 Per Cent More at 50 Per Cent

The British South Africa Company has announced in a preliminary profit statement for the year ended September 30, 1953, the payment of a final dividend of 36½ per cent (26½ per cent) making 50 per cent, or 10 per cent more than was paid in the preceding year.

On the company's 15s. shares, the final dividend is 5s. 6d. per share, making a total dividend for the year of 7s. 6d. per share or 1s. 6d. more than in the previous year.

The profit for the year ended September 30 last was £2,988,143 (£2,674,766) struck, after providing £5,972,031 (£5,635,154), for taxation. Meeting, London, March 25.

G.S. Selection Trust December Quarterly Results

The five West African gold producers in the Gold Coast Selection trust group published their results for the December quarter at the beginning of this week. They are given below compared with the preceding three periods of 1953.

	Mar. Qtr. £	June Qtr. £	Sept. Qtr. £	Dec. Qtr. £
Amalgamated Banket	74,168	74,200	73,746	72,027
Ariston Gold Mines	150,087	113,583	105,740	122,744
Bremang Gold	44,331	39,584	23,531	21,227
Gold Coast Main Reef	41,247	41,471	45,247	36,556
Marlu Gold	50,035	37,454	53,454	47,940

Although Ariston was the only company in the group reporting higher profits than in the September quarter, there were a number of interesting and encouraging announcements accompanying the quarterly statements.

Amalgamated Banket announced that the new ropeway from the Fanti Section continued to run satisfactorily, although increased production from this section is slow owing to the shortage of experienced stoning crews. Ariston announced that development work carried out on the main orebody on levels 22 and 23 exposed a rich quartz band on both levels, although at the northern end of the drives the reef width on both levels was only about 24 in.

Bremang's report contained the cheerful news that its No. 2 dredge, which has been re-assembled on the Offin River, commenced working on January 30. The company's No. 1 dredge is now being dismantled prior to its re-erection on the Offin River, leaving Nos. 3 and 4 dredges operating on the Ankobra.

Gold Coast Main Reef's quarterly, stated that in the Taupim section in a stope drive on level 13, revealed a large reef of solid quartz carrying some sporadic high values. Of the 44 ft. advanced, values averaged 5.9 dwt. per ton over 114.7 in. equivalent to 678 in. dwt. Marlu announced that certain improvements were made in the treatment plant during the quarter as a result of the use of a new reagent to assist settling.

Southern Rhodesia Gold Returns For December

At long last the production figures for Motapa Gold Mines are beginning to look interesting. The tonnage throughput is not so large as formerly but the resultant yield is showing a big improvement as are the profit figures. In fact, the December profit figure shown in the table below is the best attained since September, 1951, when over 2,300 tons were put through the mill. Even so, the year-end total is disappointing and still seems unlikely to yield a dividend.

Phoenix Prince appears in our table for the first time, the figures below being given quarterly represent in the first three columns the results for the December quarter. The December return for Falcon Mines shows that the scale of operations is gradually being increased and with it the profit.

Cam & Motor produced another excellent monthly return the gold recovery being at a new high. Globe & Phoenix finished its financial year in good style and the year end profit figure is up by about £7,000 over the 1952 total. Of the other mines, the low profit announced by Muriel was due to a serious shaft accident but there was no mitigating circumstances to account for the loss incurred by Rezende for the second month in succession. In our issue of January 1 last, when reporting the November returns a profit was announced for Rezende of £1,400. This should have been marked as a loss and thus the cumulative profit total to date should have been £15,700.

SOUTHERN RHODESIAN GOLD FIGURES - DECEMBER

Company	December, 1953			Cumulative Total to date	Corresponding Total Last Year		
	Tons (000)	Yield (oz.)	Profit (£'000)		Tons (000)	Yield (oz.)	Profit (£'000)
Arcturus	3·1	—	2·7	6	18·4	—	17·9
Cam & Motor	24·0	7,916	44·3	6	144·7	45·125	268·5
Connaught	0·8	—	1·3	6	4·8	—	8·7
Falcon Mines	16·7	2,832	7·1	3	49·3	8,027	18·0
Globe & Phoenix	6·0	3,574	4·5	12	72·2	241,059	265·9
Motapa Gold	18·5	2,431	3·1	12	243·2	28,599	18·2
Muriel Mine	2·0	—	4·9*	6	11·2	—	41·4
Phoenix Prince†	32·1	3,738	9·8	9	99·3	11,260	26·3
Rezende	6·6	752	L 5·0	12	78·2	13,362	10·7
Tebekwe	7·9	—	2·4	6	48·9	—	15·6

* Fall in profit due to serious shaft accident

† Quarterly

L Indicates a loss

Miscellaneous Gold Returns—December

British Guiana Consolidated finished its financial year on a high note, the number of ounces recovered being the best recorded for any one month during the year. On the other hand, Frontino's throughput and output were affected by the Christmas holidays, the production figure being the lowest obtained in any one month in 1953.

Geita appears to be going ahead quietly and efficiently, but Clutha River for the first time during its current year has shown a cumulative production total lower than in the corresponding period of the preceding year. Saudi Arabian continues to report astonishingly good profits from the same mill throughput and its year end figure relating to the value of its output is almost double that achieved a year ago from approximately 10,000 more tons milled.

New Guinea Goldfields, whose report and accounts for the year ended September 30 last were reviewed in these columns last week showed an improvement over the November figures which revealed an all-time low for the total amount of monthly

gold produced. But the company will have to do much better in the months ahead if it is to overtake the figures representing its performance in the corresponding period a year ago.

Company	December, 1953		Months since year end	Cumulative Total To Date		Last Year	
	Tons (000)	Yield (oz.)		Tons (000)	Yield (oz.)	Tons (000)	Yield (oz.)
Br. Gu. Consol.	166.9*	1,858	12	217.8*	16,001	168.2*	18,043
Clutha River	224.0*	364	9†	199.0*	4,282	192.9*	4,385
Frontino§	8.8	3,594	12	116.1	55,434	117.5	62,212
Kentan (Geita)	21.0	3,287	6	132.8	20,192	123.0	18,236
New Gu. G'fids	3.1	1,455	3	9.1	3,925	8.1	5,943
Saudi Arabian†	9.5	£46,398	12	101.7	£264,919	111.8	£145,013
St. John'd'E'Rey	25.8	£130,000	12	111.3	£1,755,018	381.1	£2,922,316
Tr'v'l G.M. Est.	26.1	5,630	12	319.0	65,630	330.8	62,614

* Cu. yd. dredged. † November output. ‡ 4 weekly period since year end.
§ Production affected by closing of mill for Christmas.

December Tin Returns

A quarterly notice issued by Amalgamated Tin Mines of Nigeria does more than remind shareholders of its impressive performance during the first nine months of the current year. It also emphasizes that this company (the world's largest columbite producer) has two subsidiaries, Keffi Tin and London Nigerian Mines—both columbite/tin producers—which are also expanding their production. The production figures for these three companies are noted separately in the table below but the total production of the group for the December quarter totalled 1,207½ tons tin concentrates and 279½ tons of columbite concentrates which brings the total production for the first nine months of the year for the three companies combined to 3,235 tons of tin concentrates and 646½ tons of columbite concentrates. This latter figure would be about 50 per cent of the world production in 1951.

With the high price columbite is currently commanding, it is encouraging to note that every columbite producer in the Nigerian list is able to report an improvement over the preceding year's total with the exception of Jantar Nigeria whose production remains virtually the same as for the preceding year.

There are also some very noteworthy results announced from the Malayan tin producers amongst which Siamese Tin, Sungai Way, Tronoh, Ampat, Bangrin in the Siamese Tin Syndicate group, and Kinta Tin, all of whose financial years ended in December, have shown a higher total output than in the preceding year.

Company	Dec.	Financial Year to Date		Company	Dec.	Financial Year to Date			
		Month since year end	This			Month since year end	This		
EASTERN									
Ampat	111	12	12652	898	Tambang	21½	1304	140	
Ayer Hitam§	4154	6	5454	4552	Tanjong	62	9804	981	
Bangrin	72	12	752	68	Tekka§	384	9	1084	81
Batu S.	34	3	804	602	Tekka T. §	1354	2	1354	362
Berjuntai	56	8	413	664	Temoh§	184	6	36	1394
Chenderiangs	50	9	802	646	Tongkah	334	6	2466	3734
Gopeng Cons. §	1013	3	1014	1862	Tronoh§	4934	12	1981	1712
Hongkong Tin§	1013	3	1014	1012					
Idris Hyd. §	53	12	234	321					
Ipoh Tin§	374	9	2853	2954					
Kampung A.	117	9	1015	1543					
Katingan	90	12	4142	478					
Kent (F.M.S.)§	571	6	128	162					
Kepongs§	1572	9	1752	1212					
Killinghill§	322	9	2403	1311					
Kinta K.	214	12	3393	3043					
Klang River	423	9	376	2742					
Kuala Lumpur	186	9	14423	15624					
Kuchai	313	3	92	188	Jantar	18	3	48	60
Larut‡	732	12	684	713	Jantar*	104	5	54	56
Lower Perak	1652	8	8102	790	Kaduna P.	9	12	644	662
Malayan Tin§	553	6	12013	10424	Kaduna S.	321	12	116	77
Malaysiam	134	9	90	52	Keffi*	44	9	384	270
Pahang	220	5	1100	1100	Keffi*	44	9	1164	—
Pengkalan§	120	3	120	954	Lond. Nig. M's.	144	9	1164	—
Petaling§§	3894	2	3894	588	Naraguta Ex.	21	8	1953	—
Puket Tin§	904	12	3094	491	Naraguta K.	71	12	644	90
Rahman	441	6	2404	2373	Naraguta T.	15	12	1644	134
Rambutan§	204	6	423	394	Naraguta T.*	22	12	2363	280
Rantau	591	6	3483	4902	Narukuba	104	9	672	44
Rawang Conc.	54	9	552	5213	S. Bakeru	24	9	21	82
Rawang Tin§	912	9	2414	543	Tinfields of Nig.	94	12	83	59
Renong	1303	6	467	1664	Tinfields of Nig. *	2	9	21	154
Selayang Tin§	69	3	69	48	U. Tin	58	9	58	58
S. Kinta	4874	9	3489	34504	U. Tin*	7	6	47	73
S. Malayan§	7044	6	1356	15344	U. Tin*	0.05	6	1-19	—
S. Tronoh§	1554	12	29464	1833	MISC.				
S. Tronoh§	68	12	189	635	Berali Tin†	195	9	1723	1615
Sungei Besi§	3334	9	8694	8381	Berali Tin	6	9	70	98
S. Kinta	194	12	2232	2288	Geevor	58	9	508	428
Sungei Way§	3412	6	6232	323	S. Crofty Tin	51	12	554	474
Taiping	50	12	1762	—	S. Crofty Tin†	13	12	32	3

* Columbite. † Wolfram. § Quarterly figures. ‡ No. 4 dredge closed on December 13 for repairs. A Dredge closed for installation of clay treatment plant. A No. 6 dredge shut down on November 11. C No. 2 dredge resumed work November 27.

Company Shorts

Esperanza Copper to Issue One-for-Eight at 2s. 6d.—Esperanza Copper and Sulphur announced earlier this week that Treasury consent had been attained for the issue to shareholders of 578,571 shares of 2s. 6d. each at a price of 5s. 9d. per share in the ratio of one new share for every eight shares held.

The offer will be made to shareholders registered on February 12, who will be given the opportunity to apply for additional shares.

Subject to stock exchange permission to deal being granted, letters of right will be posted to shareholders on February 23 and the lists will close on March 9. The issue has been underwritten.

John Summers and Sons Maintain Dividend.—Owing to the expenditure involved in bringing into production new plant at the Hawarden Bridge Steelworks, John Summers and Sons Ltd. have announced a group net profit for the 53 weeks ended October 3, 1953, of only £485,937 compared with £1,409,399 in the preceding year. The company has recommended the payment of a final dividend of 5½ per cent making, with the interim dividend of 3 per cent already paid, a total distribution for the year of 8½ per cent. This required £298,080 against £289,170 in the preceding year.

Mountain Copper's New Share Issue.—The Mountain Copper Company has announced the issue of 500,000 shares of 2s. each at 6s. per share to existing shareholders in the ratio of one new share for every three stock units held.

Treasury consent to the issue has been received and the announcement states that in due course shareholders will receive provisional allotment letters together with a form of application for excess shares. Mountain Copper's present issued capital is £150,000 in 2s. stock units. Mr. R. E. Binns is chairman.

LEADING FIRM OF BORING AND SHAFT SINKING CONTRACTORS have a vacancy for young mining engineer willing to travel in U.K. Good prospects and permanent position for suitable man. Applications should state age, qualifications and salary required. Reply Box 548, The Mining Journal, 15 Wilson Street, Moorgate, London, E.C.2.

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